

Appendix A. Template Records Reference

All the product text generated by RiverPro is generated using template files to control the actual text in the product. Template files use a keyword approach to identify each record (i.e. line) of the template file, with the keyword located at the beginning of the record. Following the keywords are values associated with the keyword. Each template record should begin with a keyword. If one is not specified, then a PHRASE keyword is assumed.

The template files allow for comment symbols and continuation lines. Comment lines begin with the symbol “#” in the first column. Continuation lines are designated by the continuation symbol (“&”) as the last character on the template line. Do not insert any characters after the continuation symbol.

The keywords, or record types, that are permitted for a given template depend on the product section/subsection. The template keywords are given below with a brief statement regarding their function and any restrictions on which section/subsection can use the keyword. A detailed description of the template keywords follows in the subsequent sections. Following these descriptions are a set of sample templates to demonstrate the use of the template records.

<i>Keyword(s)</i>	<i>Description.</i>
NAME	Identifies name of template and begins template definition.
PHRASESTR	Forces output of actual phrases in paragraph form. Variable values are inserted within phrase to allow “fill-in-the-blank” feature. Not used in the tabular section.
BULLETSTR	Like PHRASESTR but uses bullet format style.
INDENTSTR	Like PHRASESTR but uses indented style.
CONDITION	Controls whether output for associated phrase is produced. It gives logical expression which must evaluate to true for associated phrase to be inserted in product. Required in summary section and roundup subsection templates, and optional in headline section templates.
FORMATS/VARLIST	These are paired records. For non-tabular sections, specifies format to use for associated variables given in VARLIST; these variables may be used in PHRASESTR records. For tabular sections, the formats are for variables which are used when output is triggered by a FP_ID or LOCID record. Not meaningful in the basis section or the call-to-action section templates.
SPECTIME	Specifies times for special stage/discharge data. Although this is still supported, the “PE” variable feature should be used instead of this feature. Supported in the roundup and tabular templates. This keyword has an alternative name of SPECSTAGETIME.
	<i>These keywords are supported in the tabular template only:</i>
LITERAL	Forces literal output for product, with no insertion of variable values supported.
LOCID	Forces output for given location, using FORMATS/VARLIST info.
FP_ID	Like LOCID, but limited to river forecast points.
MISCWRT	Forces output using variables not specific to a location or forecast point.
GRPNAME	Forces output of the forecast group name.
MSGDATA	Controls how missing data are handled.
	<i>These keywords are supported in the headline template only:</i>
ACTIONBEGIN	Beginning of instruction block for given VTEC action code.
EVENTBEGIN	Beginning of instruction block for single VTEC event, for current VTEC action code.
EVENTEND	End of instruction block for event.
ACTION END	End of instruction block for action.
#	Comment line indicator.

Figure A-1. Template Record Types

A.1 NAME Records

The NAME keyword identifies the name of a template. Multiple templates can be stored in a single template file; the name uniquely identifies the template. The keyword value is the name of the template.

A.2 CONDITION Records

The CONDITION record specifies a condition which is basically an "IF statement" that must evaluate to TRUE for the phrase in the succeeding PHRASE record to be generated.

Conditions must begin and end with left and right parenthesis, respectively. Within these bounding parentheses is the complete conditional expression, which supports the following items:

- Relational operators - "LT", "LE", "EQ", "NE", "GE", "GT"
- Logical operators - "AND", "OR"
- String operators - "SEQ", "SNE"
- Integer and float constants (e.g. 12, 28.5)
- Variables (surrounded by angle brackets)
- String constants (surrounded by double quotes)
- Delimiting parentheses

A condition consists of one or more relational expressions, with each expression surrounded by parentheses, and with logical operators between any successive relational expressions. Relational expressions must be enclosed within parentheses; this is optional for logical expressions. Also, it is mandatory that all individual entries in the condition be separated by a blank(s)! This means that all parentheses must be surrounded by blanks.

There are limitations on which template variables can be specified depending on which product section is using the template. See Appendix B for more information on these access limitations. If the phrase is to always be included, the CONDITION record is still required but can have a special keyword value of "TRUE".

A.3 PHRASESTR Records

The PHRASESTR keyword value give the phrase which is output to the product. Therefore, it is arguably the most important type of template record. For templates which require CONDITION records, each PHRASESTR record must be preceded by an associated CONDITION. The phrase is generated for output only if the condition is true.

For all sections that support variable substitution, the phrase can contain embedded variable names. The value of the embedded variable is automatically inserted to form the output phrase. There are restrictions on some variables that prevent their use in certain sections/subsections of the product as described in Appendix B. The names of variables are given as a string surrounded by angle brackets as in "<MaxStg>".

The phrase itself begins immediately after the colon that terminates the keyword PHRASESTR, and ends at the end of the record (unless continuation lines are used), so be thoughtful in the use of leading and trailing blanks.

The user can specify a special sequence of characters in the PHRASESTR record that will result in the current line being terminated, and the subsequent output appearing on a new line. This feature is referred to as the forced newline feature. The special sequence is a pair of vertical bars ("||"). Anytime this sequence is encountered, a newline character is written to the product output.

A.4 BULLETSTR Records

The template record type BULLETSTR follows the same rules as PHRASESTR, but produces bullet style output as per the NWS Directive 10-1701 policy. The bulletstr record can be specified anywhere in a template that that phrasestr record is permitted. Its rules of use are the same as phrasestr; i.e. it is used with conditional control in Summary and Roundup sections, and as a non-conditional record in the other sections. The functional difference between bulletstr and phrasestr is in the leading asterisk and the word wrap feature.

NWS 10-1701 states that bullet lines have an asterisk, followed by one blank, then the text, with subsequent phrases wrapping as needed to follow up lines, which are indented by two spaces. In the template, the user can include blanks, or not, after the "bulletstr" keyword; the formatter will ignore blanks and always place the text one blank after the asterisk.

The existing RiverPro format feature of including a forced end-of-line instruction (||) in the template format record can still be used to create bullet text, but if info in a single bullet goes past one line then next line does not indent the required two spaces. The new bulletstr provides a much easier way for generating bulleted information.

A.5 INDENTSTR Records

The template keyword: identstr behaves the same as phrasestr, but ensures that the text is always indented two spaces, not just for the first line, but for any subsequent continuation lines in a string. This feature is useful for the headline section, when detailing event info.

A.6 FORMATS and VARLIST Records

The VARLIST and FORMATS keywords are paired keywords that complement each other. Therefore their discussion is presented in the same section. The way they are used depends upon whether they are in a template used for the tabular section or whether the template is for one of the other product sections/subsections.

In the non-tabular section templates, the two records work together to define the format to use for a corresponding variable. The number of formats in the FORMATS record must match the number of variables in the VARLIST record. The first variable name listed for the VARLIST is output in a format specified by the first format specification in the FORMATS; the second with the second, etc. So when formatting the value of a variable encountered when processing a PHRASESTR record, the format used is either: (1) the default format defined in RiverPro for that variable type (e.g. float) or, (2) it is the format defined in the FORMATS record for the particular. Only one FORMATS and VARLIST keyword is allowed per non-tabular template. The use of these paired keywords in the non-tabular section template is optional.

In the tabular section template, the FORMATS record not only gives the formats for corresponding variables, but also serves as the primary instructions for which data to output in the tabular text. The number of VARLIST variables must equal the number of FORMATS formats that are for variables, not necessarily the total number of format items. This is noteworthy since it is probable that the X (i.e. blank space) and literal string formats are used. The FORMATS keyword is mandatory in the tabular section template if the FP_ID keyword is used. If the FORMATS keyword contains formats for variables, then the VARLIST keyword is also mandatory. It is important that integer formats be given for integer variables, float formats for float variables, etc.

Unpredictable output results if a mismatch exists. Make sure that the format for the Nth variable in the FORMATS list matches the data type of the Nth variable in the VARLIST list. The FORMATS and VARLIST paired keywords can be repeated throughout the template because the tabular template is processed "on-the-fly". For a description of how the specified formats and variables are used for the tabular section, refer to the explanation given with the FP_ID keyword or refer to the discussion of how the tabular section text is created.

The FORMATS specifiers support many different format types, with a naming convention similar to that used in computer languages. A list of the supported formats is given below.

"I#"

Integer format, where "#" is the field width.

"I#.#"

Integer format, where "#" is the field width and any leading zeroes are included. The two numbers (#) must be equal.

"F#.d"

Float format, where "#" is the total field width and "d" is the number of digits to the right of the decimal point. The "d" value may be given as "0" to have a float value displayed as an integer. When using F#.0 formats, any leading zeroes are stripped off and the number is right-justified.

"S#"

String format, where "#" is the field width

"sss"

Literal string format, where "sss" is a string constant and may contain embedded blanks. This format is not associated with a variable. It is permitted only for the tabular template. The continuation symbol("&") can be contained as a literal within quoted literal strings of FORMATS, and will not be interpreted as a continuation symbol.

"X#"

Blank spaces, where # is the number of blanks. This format is not associated with a variable. It is permitted only for the tabular template. A variation of this format can be used to force a newline character to be written to the product output, and have subsequent text written to a new line. This feature is referred to as the forced newline feature. To use this, specify a X0 format, as in "insert 0 blank spaces".

"T_xxx"

Date/time format where xxx is from a list of allowable date/time formats that are provided. The time formats provide a considerable number of options, which are detailed in the following section!

A.6.1 Time Formats

There are many ways in which RiverPro time values can be presented in the generated product. A set of predefined date/time formats are available. There also is a way to define a custom format through use of the T_Uxxx format; there is a special T_WWA

format , and there is a special user-configurable “time phrase” format.. Each is described separately; the T_Uxxx and T_WWA are described below, while the time phrase format is described in Appendix D since it uses a file to control its formatting.

A.6.1.1 T_Uxxx Time Format

The general form of this format specifier is: T_Uxxx, where xxx is any collection of characters, and which can include any of the formatting directives listed below. These directives are based on the formatting directives available via the UNIX C function strftime(). One additional directive is also supported by RiverPro - the caret character (^) is used to represent the space character since the xxx string can not include any embedded blanks. The xxx string typically includes a combination of these directives, which are characterized by a leading percent sign. String literals can also be incorporated into the xxx string; a typical use would be for a comma. The figure below details the T_U format specifiers.

An example RiverPro usage of this format is: T_U%Y^%b^%d,^%H:%M, which would produce something with the form of: 2000 APR 6, 11:00.

^	single blank character
%a	Locale's abbreviated weekday name.
%A	Locale's full weekday name.
%b	Locale's abbreviated month name.
%B	Locale's full month name.
%c	Locale's appropriate date and time representation.
%C	The century number (the year divided by 100 and truncated to an integer) as a decimal number [00-99].
%d	Day of the month as a decimal number [01,31].
%D	Equivalent to the directive string %_m/%_d/%_y.
%e	Day of the month as a decimal number [1,31]; a single digit is preceded by a space.
%h	Equivalent to %b.
%H	Hour (24-hour clock) as a decimal number [00,23].
%I	Hour (12-hour clock) as a decimal number [01,12].
%j	Day of the year as a decimal number [001,366].
%m	Month as a decimal number [01,12].
%M	Minute as a decimal number [00,59].
%n	The new-line character.
%p	Locale's equivalent of either AM or PM.
%r	The time in AM and PM notation; in the POSIX locale this is equivalent to %_I:%_M:%_S %_p.
%R	The time in 24 hour notation (%H:%M).
%S	Second as a decimal number [00,61].
%t	The Tab character.
%T	The time in hours, minutes, and seconds (%H:%M:%S).

%u	The weekday as a decimal number [1(Monday),7].
%U	Week number of the year (Sunday as the first day of the week) as a decimal number [00,53]. All days in a new year preceding the first Sunday are considered to be in week 0.
%V	The week number of the year (Monday as the first day of the week) as a decimal number [01,53]. If the week containing January 1st has four or more days in the new year, then it is considered week 1; otherwise, it is week 53 of the previous year, and the next week is week 1.
%w	Weekday as a decimal number [0(Sunday),6].
%W	Week number of the year (Monday as the first day of the week) as a decimal number [00,53]. All days in a new year preceding the first Monday are considered to be in week 0.
%x	Locale's appropriate date representation.
%X	Locale's appropriate time representation.
%y	Year without century as a decimal number [00,99].
%Y	Year with century as a decimal number.
%Z	Time zone name (or by no characters if no time zone exists).
%%	The percent (%) character.

Figure A-2 T-Uxxx Time Format Specifiers

A.6.1.2 Predefined Time Formats

The remaining date/time format specifiers are given below and use a naming convention where the following abbreviations are used:

HH = two-digit hour,	H = one/two-digit hour	
M = month,	D = day,	Y = year,
W = weekday,	X = AM/PM indicator.	
C = character,	A = abbreviated.	

A field which can be either numeric or character is numeric unless the "C" qualifier is before it, as in "CM". A field which can be abbreviated is assumed to be unabbreviated unless the "A" qualifier precedes it as in "CAM" for character-abbreviated-month. The default format gives date-times as DD/MM HH:MM as in 03/30 22:00.

"T_Uxxx"	user_specifiable (see separate discussion)
"T_WWA"	Watch/Warning/Advisory style (see separate discussion)
"T_MMDD"	04/05
"T_MMDDYY"	04/05/97
"T_MMDDYYYY"	04/05/1997
"T_MMDDXM"	05/13 PM
"T_CAMDD"	JAN 12

"T_CMDD"	JANUARY 12
"T_CAMDDYYYY"	JAN 12 1994
"T_CMDDYYYY"	JANUARY 12 1994
"T_AWH"	WED 1 AM
"T_AWHH"	WED 10 AM
"T_WHH"	WEDNESDAY 10 AM
"T_AWHHNN"	TUE 12:30 AM
"T_WCAMDD"	WEDNESDAY JAN 12
"T_WCMDD"	WEDNESDAY JANUARY 12
"T_WCAMDDYYYY"	WEDNESDAY JAN 12 1994
"T_WCMDDYYYY"	WEDNESDAY JANUARY 12 1994
"T_AWCAMDDYYYY"	WED JAN 12 1994
"T_AWCAMDD"	WED JAN 12
"T_DDHHNN"	312359
"T_HW"	7 AM MONDAY
"T_HHW"	10 AM WEDNESDAY
"T_HHAW"	10 AM WED
"T_HHMMDD"	10 AM 01/12
"T_HHXM"	11 AM
"T_AW"	WED
"T_W"	WEDNESDAY
"T_MMDDS"	1231
"T_AWXM"	Thu PM
"T_WXM"	Thursday PM
"T_PHRASE"	(See Section D.1.3)
"T_HEADER"	1050 AM CST MON FEB 14 1994
"T_DEFAULT"	03/30 14:00

Figure A-3 RiverPro Time Formats

A.6.1.3 T_WWA Format

Note: The following discussion is excerpted from the Watch, Warning, Advisory (WWA) Application documents

The time will be identified as being in one of four time slots in a day (0-6, 6-12, 12-18, 18-23). The day is identified as today (Day0), tomorrow (Day1), etc. (DayN). For the four slots the time is given as:

For Day0, use:	early this morning, this morning, this afternoon, this evening
For Day1, use:	late tonight, Day1 morning, Day1 afternoon, Day1 evening.
For DayN, use:	late DayN-1 tonight, DayN morning, DayN afternoon, DayN evening.

For Day 0, RiverPro will use the stated phrases for the first two 6-hour slots, even

though the WWA Section 2 says these two periods are not applicable. It probably assumes this because its discussion is focused on long-term products which rarely end so quickly.

WWA Section 2 does not discuss what to do if the event time is beyond 1 week from today. In this case, RiverPro uses the day-of-the-week and absolute date, and ignores the time slot aspect of the time value. For example, for an issuance on Tuesday Feb 2, for an event on Feb 12, then the format would be "Friday February 12".

Some other rules stated in Section 2 apply. The output from the T_WWA format is shown between => xxx <= in the examples below.

a) Issuance Time and Event Start Time on the same Calendar day. When the issuance time and event start time occur on the same calendar day, the WWA watch headline will include the time phrases listed in Table 2.

Example: Issuance Time - 4 AM Tuesday; Event Start Time - 8 PM Tuesday; Event End Time - 4 PM Wednesday
...FLOOD WARNING IN EFFECT =>FROM THIS EVENING TO WEDNESDAY AFTERNOON<=...

b) Special Case #1: Similar Time Phrase for the Start and End Times. If the Start and end time use the same time phrase, then only one time phrase will be used and it will be placed after the end time.

Example: Issuance Time - 4 AM Tuesday; Event Start Time - 6 PM Tuesday; Event End Time - 11 PM Tuesday
...FLOOD WARNING IN EFFECT =>THIS EVENING<=...

c) Issuance Time and Event Start Time are on Different Calendar Days. When the issuance time and event start time occur on different calendar days, the WWA warning and advisory headline will include the time phrase and day the product is in effect for.

Example: Issuance Time - 3 PM Tuesday; Event Start Time - 5 AM Wednesday; Event End Time - 5 AM Thursday
...FLOOD WARNING IN EFFECT =>FROM LATE TONIGHT TO LATE WEDNESDAY NIGHT<=...

Example: Issuance Time - 4 AM Tuesday; Event Start Time - 6 AM Wednesday; Event End Time - 5 PM Thursday
...FLOOD WARNING IN EFFECT =>FROM WEDNESDAY MORNING TO THURSDAY AFTERNOON<=...

A.7 SPECTIME Records

The SPECTIME record provides the means of defining the specific times for observed and forecast stages. These times are specified in the following manner.

After the keyword, the next two values together specify the reference, or base, time. These two values are the date, given as either MM/DD/YYYY or by the keyword value "TODAY", and the time, given as HH:MM. Following these two values are one or more sets of three values, where the first of these three values gives a day count offset relative to the base time; the second gives an hour count offset relative to the base time, and the third gives a time window size in hours. For example, if the base time is given as 5/13/1993 07:00, and the day, hour, and window values are +1 -3 1, then this implies a stage value closest to 5/14/1993 04:00 and between 03:00 and 05:00. The SPECTIME record can contain multiple sets of these three values.

These values are then used only when a <SpecObsStg> or <SpecFcstStg> variable is specified. When these variables are specified either in a PHRASESTR record (for a non-tabular template) or a VARIABLE record (for a tabular template), then the first usage of one of these variables results in a search for a value for the time range specified by the first set of information in the SPECTIME record, the second usage uses the second set, etc. For certain stage data requests in tabular templates, the user can choose between using the <Spec...Stg> variables in conjunction with the SPECTIME records or using the observed data variables. It is suggested that the observed data variables be used instead of the <Spec...Stg> variables because of the greater flexibility and their ease of use.

A.8 LITERAL Records

The text that follows is the keyword value. It is inserted into the output tabular text verbatim, without any inserted text from a variable substitution.

A.9 FP_ID Records

The required keyword value is an identifier for a forecast point location. An FP_ID record forces output of a line of information for the forecast point, using the format given by the FORMATS record. Each format for a variable in the FORMATS record corresponds to a variable in the variables in the VARLIST record. The FP_ID record indicates the id of the forecast point to use when generating output data. Each time it is encountered, then the current FORMATS and VARLIST definitions are used.

A.10 LOCID Records

The required keyword value is a location. This template record is a generalized version

of the "FP_ID:" record. Whereas the FP_ID record type is limited for use with forecast points, the ID record type can be used with any data location.

However, the variables associated with the LOCID record (via a preceding "VARLIST:" record) can only include either the <ObsPE> type variables, and a few other select variables. The other variables supported by the ID record type are: <Id>, <IdName>, <County>, <StateId>, <StateName>, <River>, <BankStg>, <WStg>, <FldStg>, <FldFlow>, <ZDatum>, <Reach>, <Proximity>.

The LOCID record type can be particularly helpful when presenting a table of the same data for each station. In this case the FORMATS and VARLIST record can be specified once, and the LOCID record then used over and over for each line. The alternate method requires a separate VARLIST record for each station to allow the station to be uniquely specified, which makes for much "busier" templates.

A.11 GRPNAME Records

The required keyword value is the skip option. If the value is SKIP or NOSKIP, then a forecast group name is written anytime the forecast group for a forecast point specified in an FP_ID does not match the previous forecast group. If the value is SKIP, then a blank line is inserted anytime a forecast group name is written to the output product. If the value is NOSKIP, then no blank line is written.

The GRPNAME record type also supports the value of OFF, which suppresses writing the group name to the file. Because the tabular template is processed in a sequential mode, this allows the group name (typically defined as the basin name) to be turned on or off within different parts of the tabular output.

A.12 MISCWRT Records

No keyword value exists for this keyword. When this line is encountered, the FORMATS and VARLIST records are processed to generate an output line in the product, similar to the FP_ID keyword. The variables specified in the VARLIST can not be any of the forecast point variables listed in Table 6-1, although the observed data variables can be used, which allow any location identifiers including forecast points.

A.13 MSGDATA Records

The required keyword value indicates what to do in the event that missing data are encountered. The value of the keyword is either a) SKIP or b) a user-defined string to insert into the place of a missing value. If a value of "SKIP" is given, then any line in the tabular section which has at least one missing value in it is NOT written to the output product. Otherwise, the specified string is written to the output product in place of a

value that is missing.

A.14 ACTIONBEGIN, ACTIONEND and EVENTBEGIN, EVENTEND Records

These two sets of paired keywords are only supported in the headline section templates.

These four keywords: “action_begin”, “action_end”, “event_begin” and “event_end” provide a unique method for presenting information. The contents between the “action_begin” and “action_end” are called the action block. The contents between the “event_begin” and “event_end” are called the event block. It is presumed, but not required, that multiple action blocks are included in the template, with an action block provided for each of the 6 actions (NEW, CON, EXT, CAN, EXP, COR) supported for the hydrologic VTEC products. The event block must be within the action block.

The general headline template structure is:

```
template_name XXX
conditionstr: ( test )
phrasestr: xxx xxxx xxx
#
action_begin: XXX
phrasestr: yyy yyyy...
phrasestr: ggg ggg ggg...
#
event_begin:
phrasestr: zzz zzz zzz...
conditionstr: ???
phrasestr: sss sss sss ....
event_end:
#
phrasestr: ttt ttt tttt....
action_end:
#
action_begin: XXX
phrasestr: yyy yyyy...
event_begin:
phrasestr: zzz zzz zzz...
phrasestr: sss sss sss ....
event_end:
phrasestr: ttt ttt tttt....
action_end:
#
```

- a) When creating the headline section, RiverPro processes the template starting at the beginning of the named template. It processes any template records that may appear outside the action blocks, either before or after. The variables in these records are expected to be product-wide variables, not specific to a forecast point or group.

When RiverPro detects the beginning of the action block, by noting the presence of the keyword “action_begin:”, it then processes any records that may appear before the event block. When the event block beginning is encountered, it processes the entire event block for each of the included events matching the current action code, and generates the phrases for these events. This may include one or more events. Phrases within the action block, but either before or after the event block, can also be specified; the action-specific variables and fixed phrases can be specified. Product-wide could be specified, although it probably is not meaningful.

The order of action blocks in the headline template will determine the order of the output in the product.

- b) The condition and phrasestr/bulletstr/indentstr template records are allowed to be used anywhere within the template; i.e. inside or outside event or action blocks. However, there are limitations on the variables supported, depending on whether inside an action or event block; i.e. the headline template allows uses of product-wide variables outside the event block, action-specific variables inside the action block but outside the event block, and point-specific variables within the event block. No forecast group variables are allowed in any part of the headline template.
- c) Within the action block and outside the event block the text is expected to provide the summary for included events which have the same VTEC action code. RiverPro processes the records for action blocks only if a VTEC product is being created and segmenting is by forecast point. Otherwise, the action blocks and the event blocks are ignored.
- d) Within the event block is information for each included event. The event block allows use of “condition:” records to be used, similar to the roundup section. If condition is true, because either it evaluates to true or the condition is fixed to TRUE, then the phrase immediately following will be generated in the product. If there is no condition preceding the phrase, then the text is always generated in the product.

The event block allows the “varlist:/formats:” paired records to be specified to determine the formats for the variables. It will not use the formats defined outside the event block. If there are varlist/format paired records outside the event block, those are only used for phrases outside the event block.

Event blocks can only exist within action blocks. If there are outside an action block, then the event block is ignored.

A.15 Sample Templates for Header Section

```
#
# HEADER SECTION TEMPLATES
#
#-----
#   RIVER STATEMENT
name: rvs
formats: T_HEADER
varlist: <CurDate>
phrasestr:<UGCListC>
phrasestr:RIVER STATEMENT
phrasestr:NATIONAL WEATHER SERVICE SILVER SPRING, MD
phrasestr:<CurDate>
#
#-----
#   FLOOD STATEMENT
name: fls
formats: T_HEADER
varlist: <CurDate>
phrasestr:<UGCListC>
phrasestr:RIVER FLOOD STATEMENT
phrasestr:ISSUANCE NUMBER <IssuanceNumber>
phrasestr:NATIONAL WEATHER SERVICE SILVER SPRING, MD
phrasestr:<CurDate>
#
```

A.16 Sample Templates for Tabular Section

```
# TABULAR SECTION TEMPLATE
#
name: default
grpname: skip
literal:          FLD  OBSERVED          FORECAST 6AM    CREST
formats:"LOCATION    STG  STG  DAY TIME" T_AW T_AW "STG TIME"
varlist: <Day1> <Day2>
miscwrt:
literal:
specstaetime: TODAY 06:00          +1 0 4  +2 0 4
formats: X2 S9 X2 F2.0 X2 F4.1 X1 T_AWHH X2 F5.1 X2 F5.1 X3 &
F5.1 X2 T_AWHH
varlist: <IdName> <FldStg> <ObsStg> <ObsTime> <SpecFcstStg> & <SpecFcstStg>
<FcstCrestStg> <FcstCrestTime>
literal:UPPER TEST RIVER:
fp_id: BLKO2
fp_id: TONO2
#
literal:
literal:LOWER TEST RIVER:
fp_id: WANO2
fp_id: DOVO2
```

A.17 Sample Templates for Data Roundup Subsection

```
# ROUNDUP SUBSECTION TEMPLATES
#
name: default
```

```

formats: T_HHW T_HHW T_HHW T_HHW T_HHW T_HHW T_HHW
varlist: <ObsTime> <MaxFcstTime> <ObsRiseFSTime> <ObsFallFSTime> &
<FcstRiseFSTime> <FcstFallFSTime> <FcstCrestTime>
condition: ( <ObsCat> EQ 0 )
phrasestr:FOR <IdName>, THE LATEST READING IS <ObsStg> FEET &
AT <ObsTime>.
condition: ( <ObsCat> GT 0 )
phrasestr:FOR <IdName>, <ObsCatName> FLOODING IS OCCURRING, WITH &
A STAGE OF <ObsStg> FEET MEASURED AT <ObsTime>.
condition: ( <ObsStg> EQ MISSING )
phrasestr:For <IdName>, NO OBSERVED STAGE VALUE IS AVAILABLE.
#
condition: ( <MaxFcstCat> EQ 0 )
phrasestr:NO FLOODING IS FORECAST.
condition: ( ( <MaxFcstCat> GT 0 ) AND ( <FcstFSDeparture> GT 0 ) )
phrasestr:<MaxFcstCatName> FLOODING IS FORECASTED, WITH A MAXIMUM & STAGE OF
<MaxFcstStg> FEET AT <MaxFcstTime>, WHICH IS & <FcstFSDeparture> FEET ABOVE
FLOOD STAGE.
condition: ( ( <MaxFcstCat> GT 0 ) AND ( <FcstFSDeparture> EQ 0 ) )
phrasestr:<MaxFcstCatName> FLOODING IS FORECASTED, WITH A MAXIMUM & STAGE OF
<MaxFcstStg> FEET AT <MaxFcstTime>, WHICH IS EQUAL TO &
THE FLOOD STAGE.
condition: ( ( <MaxFcstCat> GT 0 ) AND ( <FcstFSDeparture> LT 0 ) )
phrasestr:<MaxFcstCatName> FLOODING IS FORECASTED, WITH A MAXIMUM & STAGE OF
<MaxFcstStg> FEET AT <MaxFcstTime>, WHICH IS & <FcstFSDeparture> FEET BELOW
FLOOD STAGE.
#
condition: ( <ObsRiseFSTime> NE MISSING )
phrasestr:THE RIVER ROSE ABOVE THE FLOOD STAGE OF <FldStg> &
AT <ObsRiseFSTime>.
condition: ( <ObsFallFSTime> NE MISSING )
phrasestr:THE RIVER FELL BELOW FLOOD STAGE OF <FldStg> AT & <ObsFallFSTime>.
condition: ( ( <FcstRiseFSTime> NE MISSING ) AND &
( <FcstFallFSTime> NE MISSING ) )
phrasestr:THE RIVER IS EXPECTED TO RISE ABOVE THE FLOOD STAGE OF <FldStg> AT
<FcstRiseFSTime> AND FALL BELOW FLOOD STAGE AT & <FcstFallFSTime>.
condition: ( ( <FcstRiseFSTime> NE MISSING ) AND &
( <FcstFallFSTime> EQ MISSING ) )
phrasestr:THE RIVER IS EXPECTED TO RISE ABOVE THE FLOOD STAGE OF <FldStg> AT
<FcstRiseFSTime>.
condition: ( ( <FcstFallFSTime> NE MISSING ) AND &
( <FcstRiseFSTime> EQ MISSING ) )
phrasestr:THE RIVER IS EXPECTED TO FALL BELOW THE FLOOD STAGE OF & <FldStg> AT
<FcstFallFSTime>.
#

```

A.18 Sample Template for Headline Section

```

name:flw_e922
phrasestr:This product includes the following rivers: <RiverList>.
phrasestr:This product applies to the : <GrpsFPList>.
phrasestr:
action_begin: CAN
phrasestr:...The flood warning is cancelled for the following rivers in &
<ActionRiverList>..
event_begin:
indentstr: <River> <Proximity> <IdName> AFFECTING <LocCntyList>
event_end:
phrasestr:

```



```

phrasestr:(optional) AFFECTING the following <ActionStateCntyList>
phrasestr:
action_end:
#
#
action_begin:NEW
phrasestr:...The national weather service in <OfficeName> has issued a & flood
warning for the following rivers in <ActionStateList>...
phrasestr:
event_begin:
formats:T_WWA T_WWA T_WWA T_WWA
varlist:<EventBeginTime> <EventEndTime> <PrevEventBeginTime> <PrevEventEndTime>
condition: ( <EventBeginTime> NE MISSING )
indentstr: <River> <Proximity> <IdName> AFFECTING <LocCntyList> from &
<EventBeginTime> until <EventEndTime>
condition: ( <PrevEventBeginTime> NE MISSING )
indentstr: The previously issue time is <PrevEventBeginTime> and &
<PrevEventEndTime>
condition: ( <PrevCat> NE <ObsCat> )
indentstr:Observed flooding changed from <PrevCat> to <ObsCat> severity & (from
<PrevCatName> to <ObsCatName> ) for the & following rivers in & <LocGeoArea>
#
condition: ( <PrevCat> NE <MaxFcstCat> )
indentstr:Forecast flooding changed from <PrevCat> to <MaxFcstCat> & severity
(from <PrevCatName> to <MaxFcstCatName> ) for the following & rivers in
<LocGeoArea>...
indentstr:OMFCat is <OMFCat> and the name is <OMFCatName>
#
event_end:
phrasestr:
phrasestr:(optional) AFFECTING the following <ActionStateCntyList>
phrasestr:
action_end:
#
#
#
name:flw_nonsegment
condition: TRUE
phrasestr: ***Headline Section***
condition: TRUE
phrasestr: This product includes the following rivers: <RiverList>.
condition: TRUE
phrasestr: This product applies to the : <GrpsFPList>.
#
#
name: fls_followupe922
formats:T_WWA T_WWA T_WWA T_WWA
varlist:<EventEndTime> <EventBeginTime> <PrevEventBeginTime> <PrevEventEndTime>
#
action_begin: COR
phrasestr:...The flood warning is corrected for the following rivers in &
<ActionStateList>...
phrasestr:
event_begin:
indentstr: <River> <Proximity> <IdName> AFFECTING <LocCntyList>
event_end:
phrasestr:
phrasestr:(optional) AFFECTING the following <ActionStateCntyList>

```

```

phrasestr:COR_Step4 - fls_e922 test phrasestr after event_end
phrasestr:
action_end:
#
action_begin: CAN
phrasestr:...The flood warning is cancelled for the following rivers in &
<ActionStateList>...
phrasestr:
event_begin:
indentstr: <River> <Proximity> <IdName> AFFECTING <LocCntyList>
event_end:
phrasestr:
phrasestr:(optional) AFFECTING the following <ActionStateCntyList>
phrasestr:
action_end:
#
action_begin:EXP
phrasestr:...The flood warning has expired for the following rivers in &
<ActionStateList>...
phrasestr:
event_begin:
indentstr:<River> <Proximity> <IdName> AFFECTING <LocCntyList>
event_end:
phrasestr:
action_end:
#
action_begin: EXT
phrasestr:...The flood warning extended for the following rivers in &
<ActionStateList>...
phrasestr:
event_begin:
indentstr:<River> <Proximity> <IdName> AFFECTING <LocCntyList> from &
<EventBeginTime> until <EventEndTime>
indentstr:The previously issue time is <PrevEventBeginTime> and &
<PrevEventEndTime>
event_end:
phrasestr:
phrasestr:(optional) AFFECTING the following <ActionStateCntyList>
phrasestr:
action_end:
#
action_begin: CON
phrasestr:...The flood warning continues for the following rivers in &
<ActionStateList>...
phrasestr:
event_begin:
indentstr:<River> <Proximity> <IdName> AFFECTING <LocCntyList> from &
<EventBeginTime> until <EventEndTime>
indentstr:The previously issue time is <PrevEventBeginTime> and &
<PrevEventEndTime>
event_end:
phrasestr:
phrasestr:(optional) AFFECTING the following <ActionStateCntyList>
action_end:
phrasestr:

```

Appendix B. Template Variables

A quick-reference list of all RiverPro variables is given in Table 6-1. A detailed description of each variable is given below in this Appendix, in Table B-1. The variables are listed in logical groupings, such as listing together all variables associated with forecast point dynamic data. In some cases, variables are so similar that they are listed on the same line. The variable names must be given exactly as listed; the names are case-sensitive. Listed after each variable are the:

- Variable Type.

The type can be either of the following:

Int -	integer whole number
Float -	real number
Str -	character String; the length of some string variable values is fixed, but for most strings it is variable
Time -	used for almost all time related variables; provides precision to the second
Date -	only used for historical time references; does not support any hour:minute:second component

- Variable Product Section/Subsection Access.

Not all variables are permitted for use in all the templates that support variable substitution. This limitation is imposed because:

- (a) certain variables are associated with a single forecast point or forecast group and are therefore only relevant when the template information is associated with a given forecast point (e.g. point-specific subsections) or forecast group (e.g. summary section);
- b) it is not logical to include certain variables in certain product sections.

Note that the basis section and call-to-action sections do not support the template variables. The codes used in Table B-1 for the template sections that do support template variables are:

H	= header
L	= headline
S	= summary
T	= tabular
R	= data roundup
I	= impact statement
C	= historical comparison

- Variable Template Condition Access.

Not all variables are permitted within the conditional statements of the templates, for reasons similar to those given above for the section/subsection access. A value of Yes means the variable can be in a conditional statement.

- Variable Description.

A brief explanation of how the value of the variable is assigned.

B.1 Numeric Coding for River Category Levels

There are some unique features of the river category variables which are noted here. These variables, which end with <...Cat> or <...CatName>, have six possible values. These variables can be represented in the templates as either numerical values or as named categories. If using these variables in condition statements, then make sure that the category value being checked against matches the value of the category as given below. For example, if checking if the category MINOR or higher, then a conditional statement may read as: (<ObsCat> GT 0).

<u>Category Description</u>	<u>Category Name Value</u>	<u>Category Number Value</u>
Undefined	MSG	-1
No flooding	NONFLOOD	0
Minor	MINOR	1
Moderate	MODERATE	2
Major	MAJOR	3
Record	RECORD	4

B.2 Description of Template Variables

Table B-1. Catalog of RiverPro Template Variables

Independent variables:

These variables are independent of any forecast group or forecast point. They are used primarily in the header and the headline sections. Other than the <Day#> variables, most are not generally used in the other sections

<ProdId>	Str	HTSRL	Y	The full product identifier for the product being generated as specified in the product settings.
<ProdCateg>	Str	HTSRL	Y	The three character category name of the product generated, as specified in the product settings.
<CurDate>	Time	HTSRL	Y	The current time, as given by the system clock.
<IssuanceNumber>	Int	HTSRL	N	The issuance number is determined by knowing the product being issued and then comparing it with the carryover data which contains

				issuance numbers for previous products. This variable is not very relevant with the advent of VTEC coding schemes, which use the event tracking number.
<HSA>	Str	HSTRICL	N	Contains the value of the HSA for the currently selected office. This name is available in the interface via the Settings Select Office main menu option.
<OfficeName>	Str	HSTRICL	N	This value is variable is from the database field: Admin.ofc It can be used to complete the phrase such as "The National Weather in <HSA> is continuing the However, since the name for backup office is not stored in the database, this value is not useful when in backup mode.
<UGCListZ> <UGCListC>	Str	HL	N	The Universal Generic Codes (UGC) header codes for zones or counties, respectively. These codes consist of a list of UGCs, followed by the expiration time of the product. The list is assembled by combining the UGCs for each of the forecast points included in the product; the UGCs for each forecast point are specified in the database for the forecast point. A list of zone numbers or county numbers can be assembled.
<GrpList>	Str	HSL	N	A list of the forecast groups that are referenced in the product. This list is formed by concatenating the forecast group names, where a group is included if it has at least one forecast point referenced in the product. The listing makes use of the ellipsis (...) to concatenate the items in the list. It has the form: "grpname1...grpname2...grpname3". This variable is supported for the generation of NWR/CRS products.
<CountyList>	Str	HSL	N	A list of the counties that are considered in the product. This list is formed by concatenating the names for those counties associated with the forecast points included in the product. Note that multiple counties may be associated with a single forecast point. The listing makes use of the ellipsis (...) to concatenate the items in the list. The value has the form: "counties in state1: cnty1... cntyN and in state2: cnty1...cntyN". This variable is supported for the generation of NWR/CRS products.
<RiverList>	Str	HSL	N	A list of the rivers that are referenced in the product. This list is formed by concatenating the river names for the forecast points that are included in the product. The listing makes use of the ellipsis (...) to concatenate the items in the list. The value has the form: "river1...river2...riverN". This variable is supported for the generation of NWR/CRS products.
<GrpsFPList>	Str	HSL	N	A list of the forecast groups, and their forecast points, for those groups and points that are included in the product. This is useful for the headline section. It generates a string of the form: "grpnameA at pt1...pt2...pt3...grpnameB at pt6...pt7...pt8". If groups are named by river reaches, then this variable is in essence a listing of all affected rivers and their associated forecast points. This variable is supported for the generation of NWR/CRS products.
<Day0> <Day1> <Day2> <Day3> <Day4> <Day5> <Day6> <Day7>	Time	HSTRICL	N	These variables represent the time for the today, tomorrow, the next day, etc. They are useful in the MISCWRT keyword for headings for the tabular section.

VTEC Variables:

These variables are all associated with VTEC information. Most variables describe the current VTEC events, but there are two variables for the previous event times. The three "list" variables are intended for use in the headline section. All the others are also useful for the headline section, although they can be used in other product sections.

<Action>	Str	TRICL	Y	Matches the VTEC .action for the specific forecast point. It's value can be "NEW", "CON", "CAN", "EXT", "EXP",
----------	-----	-------	---	--

				"COR". For non-segmentation mode, or if segmenting by forecast group or county, the value is set to "MSG". The variable is typically used within conditional expressions in the data roundup section, and in event block within the Headline section. It could also be used in the impact, crest comparison and tabular sections, but since there are no conditional expressions allowed in these sections, its use may be limited
<ActionStateCntyList>	Str	L	N	Gives the list of counties, with the state they belong to, for all events with the given action, as defined in the action block of the headline section. It is formed by concatenating the loop of state name with the single or multiple counties in it. The format is IN STATE1...COUNTY1, COUNTY2 AND COUNTY3...IN STATE2...COUNTY1...STATE3...COUNTY1 AND COUNTY2
<ActionStateList>	Str	L	N	Give the list of states for all events for the given action defined in the action block of the headline section. It is formed by concatenating the loop of state name. The format is: STATE1...STATE2...STATE3
<ActionRiverList>	Str	L	N	Gives the list of river names for the forecast points for the given action, as defined in the action block of the headline section. The format is River1...River2...River3
<EventBeginTime>	Time	TRICL	Y	Describes the VTEC times contained within the P-VTEC line. These variables are only supported for forecast point segment mode; no aggregate usage for forecast groups or county segment mode is supported. The <EventBeginTime> and <EventEndTime> variables represent only a single time, not a range of times. They can use any RiverPro time format specifier, but are meant to be used with the T_WWA format specifier.
<EventEndTime>	Time	TRICL	Y	See description for <EventEndTime>... This variable is particularly helpful to complete phrases such as "Until <time/day phrase>", it uses "Further notice" if it is missing and uses the WWA headline time phrase format.
<Evenime>	Str	TRICL	N	Describes the full time range covered by the event start and end time. By rule, it uses the format of the T_WWA format specifier. A time format from the template instructions is still required as per template syntax rules, but will be ignored if it is not T_WWA. The rules for T_WWA format are summarized separately.
<PrevEventBeginTime> <PrevEventEndtime>	Time	TRICL	Y	The begin/end time for previously issued event. This information is read from the VTECevent database table..

Forecast group variables:

These variables are intended for use in the summary section. They provide information which is specific to a given forecast group.

<GrpId>	Str	S	Y	The id of the forecast group
<GrpIdName>	Str	S	N	The name of the forecast group.
<GrpFPList>	Str	S	N	A concatenated list of forecast points, in the current forecast group, which are included in the product. The listing makes use of the ellipsis (...) to concatenate the items in the list. It has the form: "fp1...fp2...fp3...fpN". This variable is supported for the generation of NWR/CRS products.

<GrpMaxCurCat> <GrpMaxCurCatName>	Int Str	S	Y N	The current observed category number/name for the given forecast group. This is assigned the value of the maximum observed category number/name of all the forecast points in the group.
<GrpMaxFcstCat> <GrpMaxFcstCatName>	Int Str	S	Y N	The maximum forecast category number/name for the given forecast group. This is assigned the value of the maximum forecast category number/name of all the forecast points in the group.
<GrpOMFCat> <GrpOMFCatName>	Int Str	S	Y N	The maximum category number/name of the observed and forecast categories for the given group. This is assigned the value of the maximum category number/name of all the forecast points in the group, where each forecast point's maximum value is the maximum of the observed or maximum forecast category.
<GrpObsFound> <GrpFcstFound>	Int	S	Y	A flag indicating at least one observed/forecast stage/discharge value was processed for the forecast group.
<NumGrps>	Int	S	Y	The number of groups included in the product.

Location Reference Variables

These variables can be used for locations and are not limited to forecast points. Locations which are forecast points can use these variables in any product section that supports the variable, which is indicated in the table. However, since non-forecast point locations are only supported in the tabular section, the use of these variables for locations which are not forecast points is limited to the tabular sections.

<Id>	Str	TRICL	Y	Location identifier.
<IdName>	Str	TRICL	N	Location name.
<County>	Str	TRICL	N	County that contains the location. This is not the same value as the definition of the counties associated with a forecast point.
<StateId>	Str	TRICL	N	The two-character abbreviation of the state within which the location is located.
<StateName>	Str	TRICL	N	The name of the state within which the location is located.
<River>	Str	TRICL	N	The name of the river for which the location is associated.
<Reach>	Str	TRICL	N	A description of the river reach represented by the location.
<Proximity>	Str	TRICL	N	A word, such as "AT" or "NEAR", indicating the proximity of the location to its descriptive name.
<LocCntyList>	Str	TRICL	N	The list of counties considered for the event. It is formed by concatenating the county names for those counties that are associated with the forecast point. Examples, depending on the number of counties, are: MONTGOMERY...FAIRFAX AND LOUDON COUNTIES MONTGOMERY AND PRINCE GEORGES COUNTIES MONTGOMERY COUNTY
<LocGeoArea>	Str	TRICL	N	For each location id, it includes a description of the affected areas. This could include a list of cities, or any kind of geographic description. The description can be up to 80 characters.
<FldStg>	Float	TRICL	Y	The flood stage for the location.
<BankStg>	Float	TRICL	Y	The bankfull stage for the location.
<WStg>	Float	TRICL	Y	The warning stage for the location.
<FldFlow>	Float	TRICL	Y	The flood flow for the location. Note that there is currently no variable available for action flow.
<ZDatum>	Float	TRICL	Y	The zero datum value for the location.
<StgFlowName>	Str	TRICL	T	<StgFlowName> has a value of either "stage" or "flow". It is defined by the RiverStat definition of the primary_pe field.
<StgFlowUnits>	Str	TRICL	T	The <StgFlowUnits> has a value of either "feet" or "cfs". It is defined by the RiverStat definition of the primary_pe field.

Forecast Point Referenced Variables

These variables are for forecast points only; they can not be used for non-forecast point locations. The categorical values are truly static values, while the impact and historical crest information is static information, but is selected based on the current hydrological conditions.

<MinCatVal> <ModCatVal> <MajCatVal> <RecCatVal>	Float	TRICL	Y	The stage or discharge values that define the lower limit of the minor, moderate, major, near-record, and record categorical stages.
<ImpactStg>	Float	IL	N	The stage associated with the selected impact statement, determined automatically or specified explicitly.
<ImpactDescr>	Str	IL	N	A description of the impact for the associated impact stage.
<HistCrestDate>	Date	CL	N	The date associated with the selected historical crest, determined automatically or specified explicitly.
<HistCrestStg>	Float	CL	N	The stage associated with the selected historical crest.

Forecast Point Previous Variables

These variables provide information on conditions for the given forecast point at the time of the issuance of the previous product which contained the forecast point. They are not part of the VTEC definition of any previous event, although they should be consistent with the H-VTEC attributes in the previous issuance.

<PrevCat> <PrevCatName>	Int Str	TRICL	Y N	The category number/name of the maximum of the previously observed or maximum forecast stage.
----------------------------	------------	-------	--------	---

Location Physical Element (PE) Variables

These variables are very powerful in extracting the numeric value and time of most observational data stored in the IHFS database. They are described in detail in the body of the document. The

<"PEVal">	Float	TR	Y	The value for a physical element value extracted from the IHFS database.
<"PETIME">	Time	TR	N	The time of a value for a physical element extracted from the IHFS database.

Forecast point stage variables

For almost all "stage" variables given below, the variable actually uses either stage or discharge, depending upon which is the designated primary physical element for the forecast point. The "stage" variables that do not operate in this fashion are the "rise above" and "fall below" variables.

<ObsStg> <ObsCat> <ObsCatName> <ObsTime>	Float Int Str Time	TRICL	Y Y N Y	The most recent observed stage, numerical category, category name, and time.
<MaxFcstStg> <MaxFcstCat> <MaxFcstCatName> <MaxFcstTime>	Float Int Str Time	TRICL	Y Y N Y	The maximum forecast stage, numerical category, category name, and time.
<OMFVal>	Float	TRICL	Y	The value, numerical category, and category name of the

<OMFCat> <OMFCatName>	Int Str		Y N	maximum of current observed or maximum forecast.
<ObsStgTrend>	Str	TRICL	Y	The trend of the observed data is determined by comparing the most recent stage with a prior stage. To define the prior stage to use, the minimum and maximum values of the observed stage data, prior to the most recent stage, are determined. To be considered a maximum or minimum, the value must be greater than or less than, respectively, the current observed stage by a threshold different. This threshold is defined by the token rpf_stage_window. If it is not defined, it defaults to a value of 0.5 feet. This prevents small variations in the stage from dictating the computed trend, when what is more important is the larger scale trend. Once the maximum and minimum values are determined, then the most recent of these two values are used as the prior stage. This ensures that the most recent trend of the data are used, since the stage may be rising and falling and rising, etc. The resulting comparison yields one of the following values: "rising", "steady", or "falling". If not enough data are available to make a determination, the value is "unknown".
<StgTrend>	Str	TRICL	Y	This variable is the same as the observed trend except that it considers the overall trend and factors in the forecast data trend. It is determined by comparing the most recent stage with a forecast stage. If no forecast stage is available, the overall trend is set to the observed trend. The forecast stage value used is the earliest of either the maximum or minimum stage value which is outside a stage window (see above discussion on the threshold difference), centered on the most recent stage. If no observed data are available, then the value is determined by comparing the first forecast value with the earliest of the maximum or minimum values outside the stage window, and that is later than the first forecast value.
<FcstTrend>	Str	TRICL	N	A phrase determined by reviewing the full time series and applying the appropriate phrase for the characteristics from this analysis of the time series. This feature uses a lookup file to allow local control of the phrasing. The method for analyzing the time series is described in a separate appendix.
<ObsCrestStg> <ObsCrestTime>	Float Time	TRICL	Y	The most recent observed crest value or time. The crest is defined by a value that is greater than the preceding and following values. The algorithm can detect sustained crests, where the value rises to a crest level, remains there for some duration, then eventually drops below the crest level. If multiple observed crests exist, the most recent one is logged, regardless of whether other crests are higher than it. The algorithm is able to consider observed and forecast data together so that if the last observed value is the crest, then this will be correctly identified as a crest.
<FcstCrestStg> <FcstCrestTime>	Float Time	TRICL	Y	The earliest forecast crest value or time. The algorithm is able to consider observed and forecast data together so that if the first forecast value is the crest, then this will be correctly identified as a crest.
<ObsRiseFSTime> <ObsFallFSTime>	Time	TRL	Y	The time that the observed stage rises/falls to or above/below the flood stage. This time is determined by checking observed stage values and checking if two consecutive stage values are such that the earlier is equal to or below/above the flood stage and the later is equal to or above/below the flood stage. A simple linear interpolation is used to determine the precise time. In the event of multiple observed rise above flood stage events, the most recent event is associated with this variable.
<FcstRiseFSTime> <FcstFallFSTime>	Time	TRL	Y	The time that the forecast stage rises/falls to or above/below the flood stage. In the event of multiple forecast rise above flood

				stage events, the earliest event is associated with this variable. The algorithm considers the special case of a pass-thru flood stage occurring between the most recent observed value and the first forecast value.
<ObsFSDeparture> <FcstFSDeparture>	Float	TRL	Y	The difference value obtained when subtracting the flood stage from the current observed/maximum forecast stage.
<ObsFSDepartureA> <FcstFSDepartureA>	Float	TRL	Y	The absolute value of the difference between the flood stage and the current observed/maximum forecast stage.
<MaxObsStg24> <MaxObsStg06>	Float	TRICL	Y	The maximum observed value in the previous 24/06 hours. The "PE" variable should be used instead of these variables.
<SpecObsStg> <SpecObsStgTime>	Float Time	TRL	N	A specific observed value or time. The time of the specific value to use is defined via the SPECTIME template keyword. The "PE" variable should be used instead of these variables.
<SpecFcstStg> <SpecFcstStgTime>	Float Time	TRL	N	A specific forecast value or time. The time of the specific value to use is defined via the SPECTIME template keyword. The "PE" variable should be used instead of these variables.
<NumObsStg> <NumFcstStg>	Int	RL	Y	The number of observed/forecast stage values.